

Chapter 1 Purpose of and Need for Action

1.1 UNDERLYING NEED FOR ACTION

Bonneville Power Administration (BPA) is a federal agency within the U. S. Department of Energy (DOE). BPA markets wholesale electric power and operates and markets transmission services in the Pacific Northwest. BPA's customers include publicly-owned and investor-owned utilities, as well as large industrial customers, such as aluminum plants. BPA also sells or exchanges power with utilities in Canada and the western United States.

Tanner Electric Cooperative (Tanner), a **non-generating public utility**¹ and a **full requirements customer** of BPA, requires additional power and new facilities to serve its customers in and around the city of North Bend, Washington.

Tanner presently receives all of its power from BPA. Puget Sound Energy (Puget), an investor-owned utility, **wheels** it for BPA over Puget's 115-kilovolt (115-kV) transmission system. Tanner takes delivery of the power at Puget's North Bend **Substation**. From there, Tanner distributes the power on its 12.5-kV system to its retail customers in the North Bend area.

In December 1998, Tanner's North Bend **load** peaked at 8,045 kilowatts (kW) during a three-day cold snap in which low temperatures in the Puget Sound area were at a normal level for the winter. The remainder of the 1998/99 winter was relatively mild, as was the winter of 1999/2000. This means that the Puget Sound area has not experienced normal winter low temperatures since December 1998. Given Tanner's customer growth since December 1998, a peak load of approximately 9,000 – 10,000 kW is expected under normal winter low temperatures. Electrical loads at North Bend are growing at about 5 percent annually.

To meet the needs of existing Tanner customers at North Bend, BPA has an interim transmission service agreement with Puget with a contract demand of 8,000 kW; however, if a critical element of the transmission system in the area were out of service for any reason, Tanner's winter peak load requirement could not be met. Under this condition, electrical load in the North Bend area would be curtailed, affecting both Tanner and Puget customers. Serving loads in this manner does not meet BPA's reliability criteria. In order to supply firm reliable power to the North Bend area, additional **capacity** is needed.

¹ Words or phrases within sentences shown in **boldface type** are defined in the glossary (Chapter 6).

1.2 PURPOSES

In satisfying the underlying need for action, BPA would like to achieve the following purposes:

- Maximize overall system efficiency through one-utility planning.
- Minimize impacts to the **human environment**.
- Minimize costs.

1.3 OTHER PROJECTS IN THE AREA

BPA Projects. To effectively operate the system in a reliable manner, BPA must occasionally rebuild or expand portions of existing facilities, or add new facilities, after first determining the efficiencies that could be achieved through conservation, load sharing or leasing other's under-utilized transmission lines in the area.

The proposed project closest to the North Bend area is the re-termination of the existing Schultz-Raver 500-kV line into BPA's Echo Lake Substation, located a few miles southwest of the city of Snoqualmie, Washington. This project requires construction of approximately 15 kilometers (9.5 miles) of new 500-kV transmission line into the Echo Lake Substation from the south. BPA has initiated an environmental review of the proposed action under the **National Environmental Policy Act** (NEPA). The environmental impact statement (EIS) on that project will be available for public review in summer 2001. When the environmental process is complete, BPA will decide whether to proceed with the action. If BPA elects to build the project, construction probably would take place in 2002.

Although no additional BPA projects have been funded for the immediate project area, BPA system planners continually study the system to identify the facilities that might be needed in the future to ensure safe and reliable operations. Once a need is identified, BPA undertakes an environmental review, including public notification and consultation, before making a decision on a proposal.

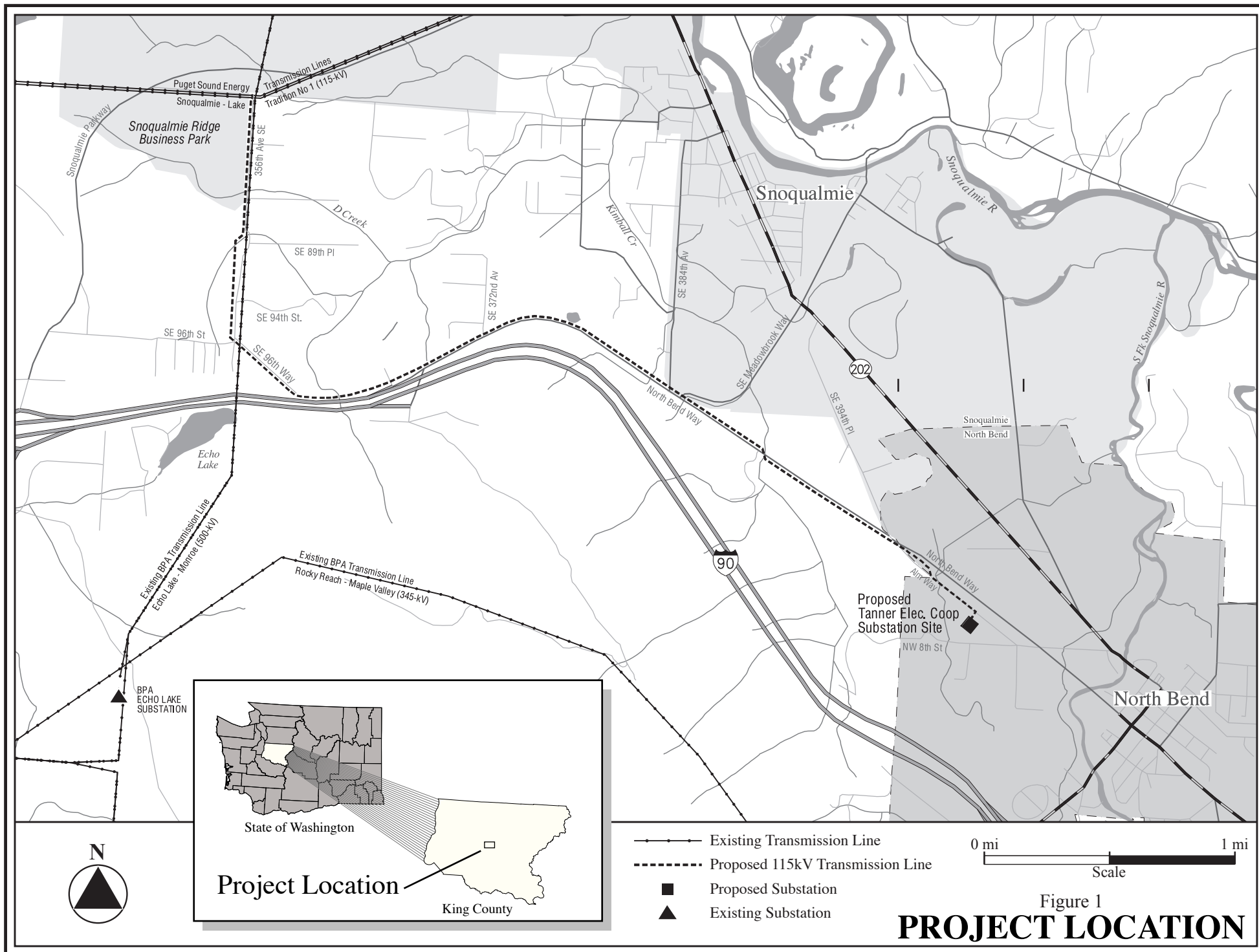
Puget Projects. To continue to serve its customers in the area, Puget proposes to either add a second transformer to the proposed Tanner Substation, or lease a second transformer from Tanner when needed to serve future loads. Puget may also locate a new substation (the Mt. Si Substation) in the general vicinity of the proposed tap point. Puget's current planning indicates that a new substation may be needed in this area to serve the Snoqualmie Ridge and surrounding area by 2003, although no decision has been made to do so, and no site has been acquired. If a decision were made to go forward with this proposal, Puget would undertake its own environmental review and seek its own permits from the affected local governmental jurisdiction. For more information, please contact Puget Sound Energy or refer to the King County Comprehensive Plan.

1.4 PUBLIC INVOLVEMENT

BPA released the Preliminary Environmental Assessment for a 30-day public and agency review in May 2000. During that time, BPA received comments orally, via e-mail, and by letter. In addition, BPA received comments at a public open house held in the City of North Bend, Washington on Monday, June 5th, mid-way through the comment period.

All of the comments received during the review period, as well as those that came in following “close of comments,” are in Chapter 8, organized by chapters of the Preliminary EA. Responses to the comments are also in Chapter 8.

As a result of the comments received, changes to the Preliminary EA have been made in this Final EA. Substantive changes to the document have been underlined.



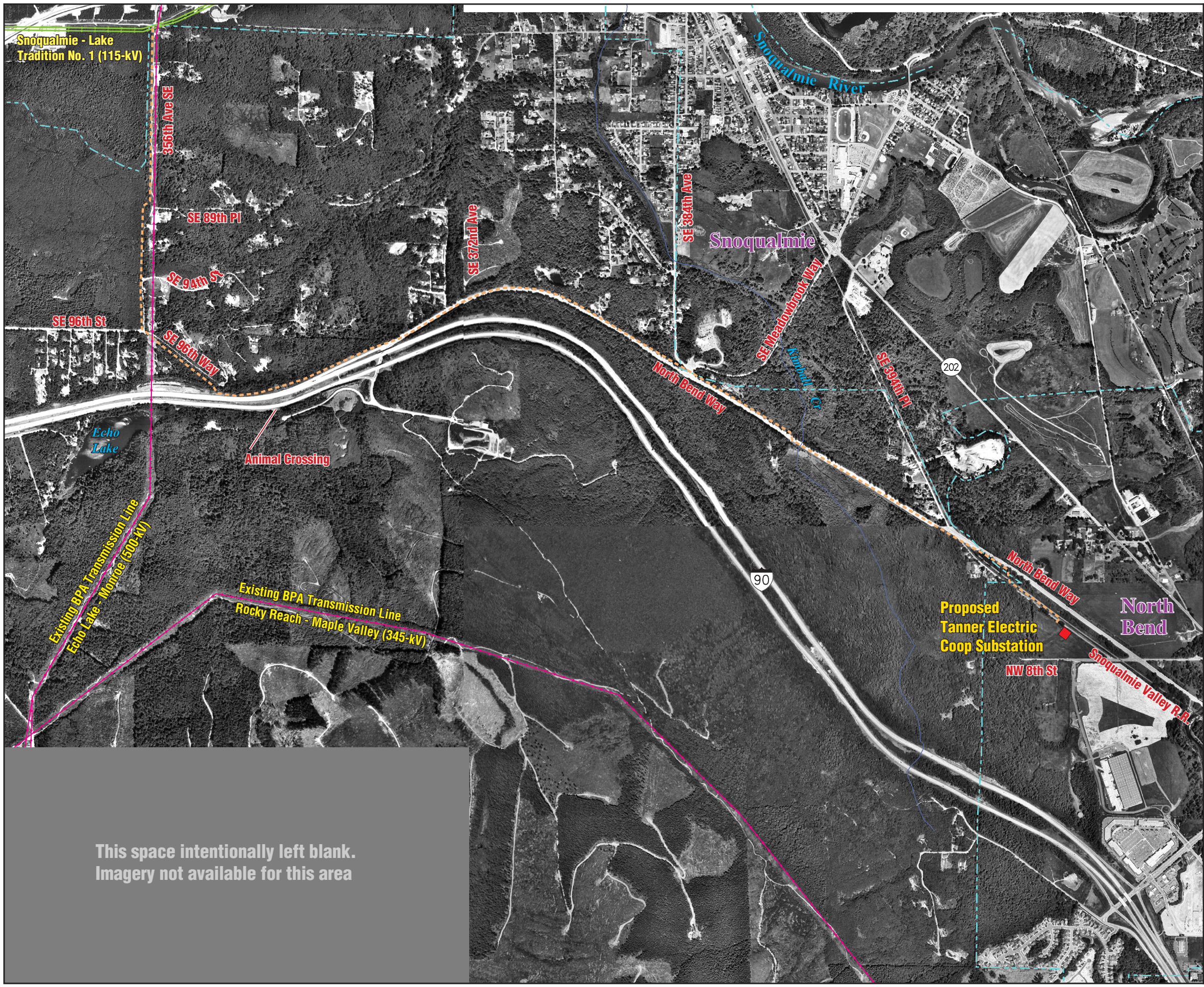


FIGURE 2
PROPOSED ACTION
TANNER ELECTRIC
TRANSMISSION LINE PROJECT

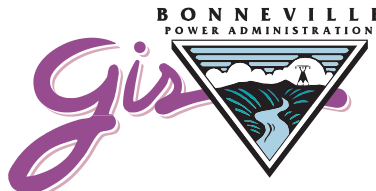
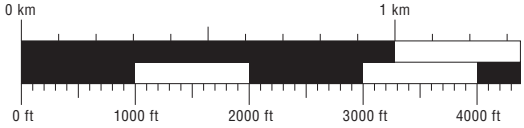
LEGEND

- PROPOSED ROUTE
- EXISTING BPA TRANSMISSION LINE
- EXISTING PSE TRANSMISSION LINE
- CITY BOUNDARY
- PROPOSED SUBSTATION

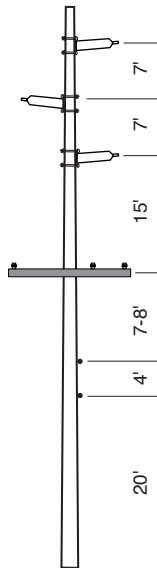
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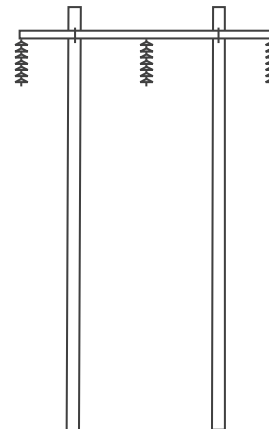


Proposed Wood Pole Structure Design



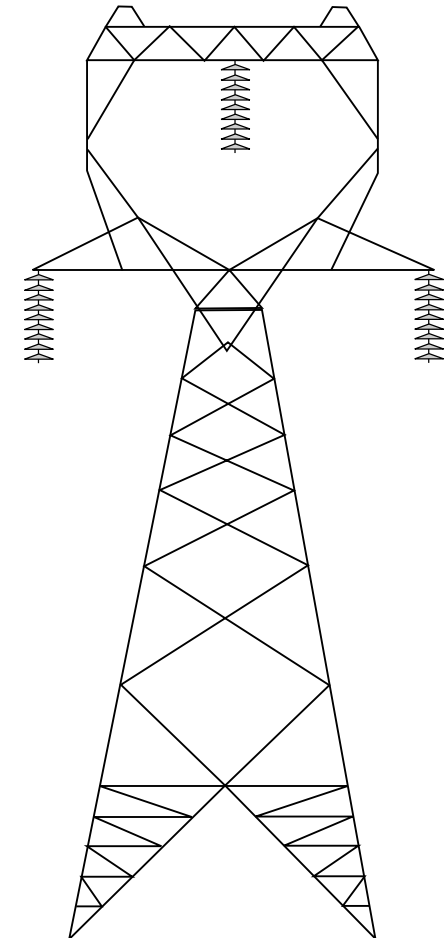
Proposed
115 kV single wood pole

average height 65-75'
average span 200-250'



Proposed
115 kV wood pole H-frame

average height 47.5'
average span 290'



Existing
500 kV lattice steel tower

Typical of tower used on Echo Lake - Monroe
Line in project area

average height 115'
average span 1100'

Chapter 2 Alternatives Including the Proposed Action

2.1 PROPOSED ACTION

To meet the need described in Section 1.1, BPA proposes to construct a new 7-kilometer (4.5-mile), 115-kV **single-circuit** electric power **transmission line** in unincorporated King County and in the City of North Bend, Washington, to be energized in the fall of 2001. As a **connected action**, Tanner would construct a 115-kV/12.5-kV substation in North Bend, Washington that would be named Tanner Substation. (See Figures 1 and 2 for locations of the proposed transmission line route and substation.)

Puget's Snoqualmie-Lake Tradition No. 1 115-kV transmission line, near Snoqualmie, has capacity to meet the load requirements described in Section 1.1. BPA proposes to **tap** this transmission line near its intersection with BPA's Echo Lake-Monroe 500-kV transmission line and to deliver the power to Tanner's proposed Tanner Substation.

In June 1999, BPA entered into an agreement with Tanner and Puget to provide power to Tanner at Tanner's proposed substation site, subject to environmental analysis and other processes. The agreement (North Bend Settlement Agreement) contemplates that BPA design and construct the proposed transmission line to accommodate an electrical **distribution** line for Puget on its proposed transmission pole structures (called an "**underbuild**") (Figure 3), assuming Puget obtains the rights from the property owners to do so. Tanner also plans to provide space for a transformer bay within Tanner Substation for future use by Puget.

Aspects of the proposed line:

- Existing BPA **right-of-way**
Total distance: 1 km (0.6 mi)
Width: 8 meters (27.5 feet)
- New right-of-way on private land
Total distance: 2 km (1.3 mi)
Width: 7 - 15 m (22.5 - 50 ft)
- Use of public rights-of-way on state land (I-90 right-of-way), county right-of-way (North Bend Way), and city rights-of-way (North Bend Way and Alm Way)
Total distance: 4 km (2.6 mi)
Width: 15 m (50 ft)
- A single-wood-pole design (Figure 3), except in one location (see Section 2.1.2)
- Construction of approximately 2 km (1.25 mi) of new access roads.

The transmission line would cost approximately \$3.4 million.

The proposed substation would:

- Use 2.1 hectares (5.3 acres) of land owned by Tanner Electric Cooperative
- Construct approximately 30 m (100 ft) of new access road across Tanner property
- Cost approximately \$1.2 million.

2.1.1 Proposed Line Route

Figure 2 shows the proposed route. BPA would tap Puget's Snoqualmie-Lake Tradition No. 1 115-kV transmission line near where BPA's existing Echo Lake-Monroe 500-kV transmission line crosses Puget's line. From this point, the proposed route would proceed south using the western side of BPA's existing 45-m (150-ft) wide right-of-way for approximately 1 km (0.6 mi) to a point where 356th Avenue SE jogs to the west. The line would also veer west and then continue south on the west side of SE 356th Avenue to a point just north of SE 96th Street. From this point, the line would proceed in a southeasterly direction on the south side of SE 96th Way (a private road) before entering the I-90 state right-of-way.

The line would continue eastward in the I-90 right-of-way for approximately 0.8 km (0.6 mi) before joining North Bend Way on county-owned right-of-way. The route would continue in an easterly direction on the north side of North Bend Way to approximately Kimball Creek. From there the line would cross the road and proceed in a southeasterly direction on the south side of North Bend Way until a point about 245 m (800 ft) past the intersection with Alm Way in North Bend. From this point, the line would turn south to the north side of Alm Way and continue southeasterly until it crossed Alm Way to enter Tanner Substation.

2.1.2 Proposed Line Design












Figure 3 shows the project's existing and proposed transmission structures. The transmission line would be supported primarily by single wood pole structures, spaced approximately 62-78 m (225-250 ft) apart. The structures would be 20-23 m (65-75 ft) tall. Figure 3 shows how they would look with Puget's distribution line and a telephone line on the same poles. In one location (where the new line would cross under BPA's 500-kV line), horizontal placement of **conductors** would be necessary, thus requiring use of H-frame wood-pole structures 14 m (47.5 ft) tall.

2.1.3 Proposed Right-of-way

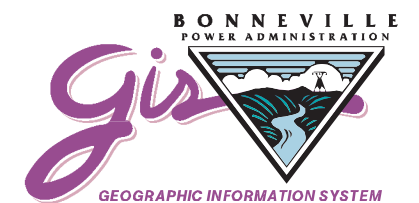
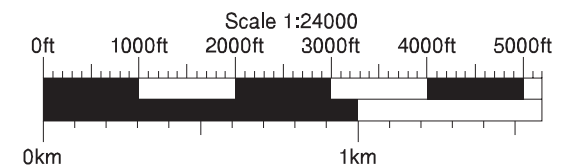
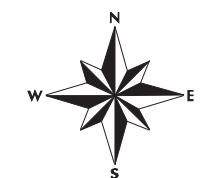
On most land, BPA would acquire a 15-m (50-ft) right-of-way. The exception is where an 8-m (27.5-foot) portion of an adjoining BPA right-of-way could be used near the city of Snoqualmie, in which case a narrower right-of-way (7 m [22.5 feet]) would be needed. For the entire line, BPA would require a 15-m (50-ft) wide cleared area, plus the removal of "danger trees." Danger trees are those trees outside of the right-of-way that could grow into or fall into the line within the next five years. Although tree clearing within the fifty foot clear-zone would need to be done in most areas, removing danger trees would be undertaken only where necessary.

**FIGURE 4
ALTERNATIVES EXCLUDED**

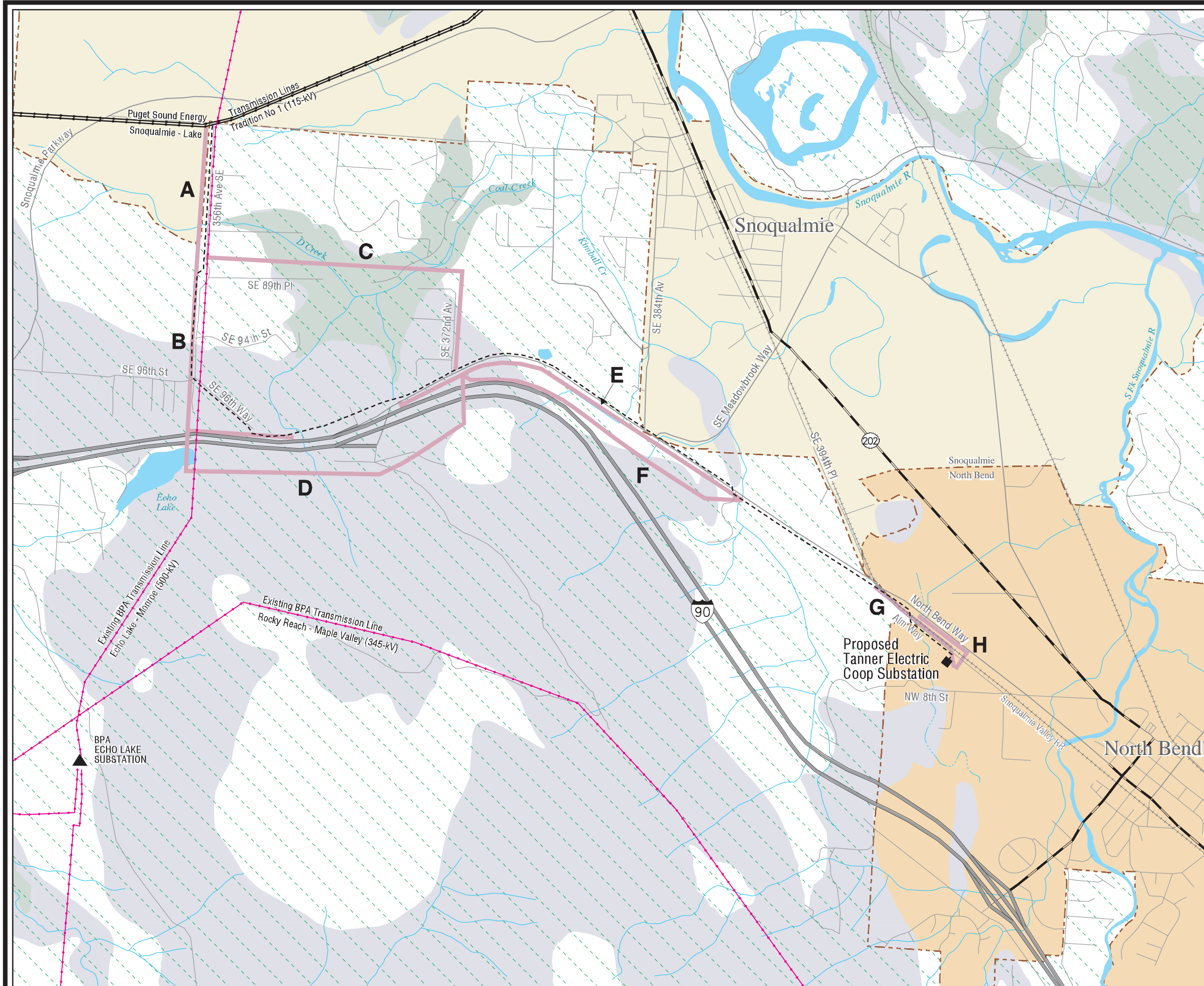
**TANNER ELECTRIC
TRANSMISSION LINE PROJECT
LEGEND**

-  Proposed route
-  Alternatives considered but dropped from future consideration
-  Existing BPA Transmission Line
-  Existing PSE Transmission Line
-  Existing Substation
-  Proposed Substation
-  Snoqualmie
-  North Bend
-  Unincorporated King County
-  Erosion hazard
-  Landslide hazard

Source: King County GIS, 1999.



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2.1.4 Proposed Substation

Tanner would build a 115/12.5-kV substation on an undeveloped 2.1 ha (5.3 ac) triangular-shaped parcel the utility recently acquired from Puget. The substation site is located off Alm Way in North Bend. It would be bounded by Alm Way on the north, Gardiner Creek on the west, and NW 8th Street on the south. The substation would be oriented to Alm Way, set back approximately 18 m (60 ft) from the road. It would be surrounded by an 2.4-m (8-ft) tall fence, 49 m (160 ft) long and 38 m (125 ft) wide, and would be landscaped. The fenced area would accommodate future use by Puget.

2.2 NO ACTION ALTERNATIVE

The National Environmental Policy Act of 1969, as amended (NEPA), requires that federal agencies consider the consequences of not taking a proposed action (the No Action Alternative) before making a decision that may have an effect on the environment. The rationale for evaluating "No Action" is to provide a benchmark that enables decision-makers to compare the magnitude of the environmental effects of the Action Alternative compared to doing nothing.

If BPA took no action to serve the need identified in Section 1.1, because Puget's power forecasts indicates a need for an additional substation in North Bend, Puget likely would build a substation at the North Bend site anyway. (Puget sold the site to Tanner as part of the agreement described in Section 2.1.) Because its existing 115-kV system also is near capacity, Puget also probably would construct a transmission line to serve the substation, which could likely follow the alignment as described in the Proposed Action.

Therefore, the No Action Alternative would likely result in the construction by another entity of nearly the same facilities as described in the Proposed Action. If no new facilities were constructed by any entity, service to Tanner and Puget customers would deteriorate and both utilities would be unable to serve new customers.

2.3 ALTERNATIVES CONSIDERED BUT ELIMINATED

2.3.1 Alternative Route Segments

BPA analyzed a number of alternative route segments before selecting a proposed route. The alternative segments and the reasons they were eliminated are described below. Figure 4 shows their location relative to the proposed route.

Segment A (Quadrant Alternative). This alternative would construct the 115-kV line approximately 150 m (500 ft) west of BPA's existing transmission line from the proposed tap point south for approximately 0.8 km (0.5 mi). The Quadrant Alternative is so named because the segment would cross the 30 ha (73-ac) Snoqualmie Ridge Business Park on land owned by the Quadrant Corporation. The route would be approximately 150 m (500 ft) west of BPA's existing Echo Lake-Monroe 500-kV transmission line in the city of Snoqualmie. The line would tap Puget's 115-kV transmission line approximately 150 m

(500 ft) west of the currently proposed tap point, proceed south across the east side of the Business Park, and cross D Creek to a point where the project, as proposed, would cross to the west side of the SE 356th Avenue.

This alternative has been dropped from further consideration primarily due to high land costs, and secondarily for environmental reasons. Quadrant, the development arm of the Weyerhaeuser Corporation, received approval from the City of Snoqualmie for the development and has recently completed necessary infrastructure improvements. The company now is marketing building sites within the business park. BPA appraisers have estimated that the cost of acquiring right-of-way within the business park would approach \$2 million over the cost of the entire project (\$3.4 million).

The alternative would also require clearing substantially more vegetation where the line crosses D Creek, a forested wetland in the city of Snoqualmie, than would using existing BPA right-of-way in this area.

Segment B (I-90 Alternative). This alternative would locate the proposed transmission line on the north side of the I-90 corridor for approximately 1.6 km (1 mi) before entering the North Bend Way right-of-way. The alternative was dropped from further consideration primarily because of input from the Washington State Department of Transportation (WSDOT). Although it allows utility crossings, WSDOT has a policy against utilities siting facilities parallel to the road within state rights-of-way unless no reasonable alternatives exist for doing so (Tim Wicks, Permit/Franchise Engineer, WSDOT, pers. comm., February 12, 1999). Placing utilities in state rights-of-way could compromise the safety of the travelling public. Even though a portion of the proposed route is located in the state right-of-way (there were no reasonable alternatives for siting the line at that location), there is an alternative to Segment B (i.e., along SE 96th Way, a private road). Because an alternative exists to minimize the amount of the transmission line within the state right-of-way, Segment B was dropped from further consideration.

Segment C (Overland Alternative). This alternative would head eastward from a point just north of SE 89th Place to a point just east of SE 372nd Avenue. The segment would then head south along the east side of SE 372nd Avenue to North Bend Way.

Approximately 1000 m (3200 ft) of this alternative would involve clearing a right-of-way over steep terrain that is prone to landslides, as identified by King County (Figure 4). The King County Sensitive Areas Ordinance (Section 47) identifies "Landslide Hazard Areas" as those areas that are subject to a severe risk of landslide. This alternative also crosses D and Coal creeks. Because of the steep terrain, BPA probably would need to construct H-frame wood pole structures over the creeks. H-frame structures normally require a wider right-of-way than do single wood pole structures; therefore, additional clearing likely would be required. The terrain's steepness also probably would require switchbacks in the road needed to access each of the structures. These switchbacks would require additional clearing and land rights beyond those needed for access roads on relatively flat terrain. For these reasons, this segment was dropped from further consideration.

Segment D (Southern Alternative). BPA was asked by a group of affected property owners on SE 96th Way to locate the transmission line further south to avoid affecting the residents on the north side of the I-90 right-of-way. This alternative would require two

crossings of the I-90 right-of-way within an area overseen by the Mountains to Sound Greenway Trust (Greenway Trust): one near mile 26 and another a half-mile farther east. The Greenway Trust is a 144-km (90-mi) stretch of I-90 that has been designated a National Scenic Byway, the only interstate highway in the United States to be so designated. It begins at scenic and historic sites along the Seattle waterfront and continues through suburban, rural and mountain landscapes to the historic town of Thorp, in central Washington. The Greenway Trust guides and coordinates actions to protect and enhance the environmental and scenic elements of the I-90 corridor.

The alternative would require acquisition of an easement from three landowners on the south side of the state right-of-way, one of which is reluctant to grant BPA an easement due to a pending transfer of title to the Land for Public Trust. The parcel is being acquired as part of the Greenway. It would be maintained in its natural state, protected from urban encroachment, in perpetuity (Nancy Keith, Executive Director, Mountains to Sound Greenway Trust, written communication, August 13, 1999). A high voltage transmission line across the parcel would be at odds with this use.

In addition, at the eastern I-90 crossing, spanning both the highway and the North Bend Way on-ramp would be difficult due to the distance and relatively flat topography at this location. WSDOT would be unlikely to approve a structure between the east- and west-bound lanes of I-90 for safety reasons, so structures at this crossing would need to be unusually tall to maintain the required electrical clearances.

Other reasons for eliminating this alternative are: (a) the amount of additional private land (approximately fifty percent more than the proposal) that would need to be acquired (as opposed to locating the transmission line mostly on public right-of-way); and (b) the additional half-mile length of the transmission line (which would increase both construction costs as well as **electrical line losses**).

Segment E (South Side of North Bend Way Alternative). A group of property owners near SE 372nd Avenue asked BPA to locate the transmission line on the south side of North Bend Way instead of on the north side. In this location, the transmission line would be on one side of the road and the distribution system on the other, creating a "tunnel" effect to motorists and other users of North Bend Way. Puget's distribution lines could, in theory, have been under-built on the BPA transmission poles. However, Puget is reluctant to move their distribution system to the south side of the county road because their customers in this area are on the north side.

This alternative also would increase materials costs by approximately \$120,000, due to the need to install steel poles along the curved portion of the road. Using wood poles on the south side of North Bend Way in this location would require that they be guyed to anchors on the north side of the road in order to offset the tension placed on them by the curve. Unlike wood poles, steel poles would not need to be guyed, but they cost more. The increased cost would not meet one of the project purposes, to minimize costs.

Segment F (Island Alternative). BPA was asked by a property owner to look at an alternative route between North Bend Way and I-90, to minimize visual impacts to residents near SE 372nd and North Bend Way.

This alternative would require a large amount of clearing on both state and county land, including many large trees (some more than 90 centimeters [36 inches] in diameter). By contrast, the proposal is located in the county right-of-way on the north side of North Bend Way, where clearing for the paved surface and a distribution line has already been done. The proposal therefore requires clearing on only one side of the line, whereas Segment F would require clearing on both sides of the line.

This route also would cross terrain with relatively steep gradients, i.e., slopes greater than 20 percent. Slopes greater than 15 percent normally require switchbacks to allow utility vehicles access to transmission poles and structures. Switchbacks in this area probably would require that the access roads be constructed outside of the 15-m (50-foot) cleared area, adding to the clearing identified above.

In addition, a WSDOT representative indicated to BPA that they would be reluctant to support a line within the state right-of-way at this location, because a reasonable alternative exists (Tim Wicks, personal communication, December 1999). King County also was reluctant to support this alternative due to the amount of clearing that would be required (Tom Henry, personal communication, March 2000). Because of the steepness of the terrain, the amount of clearing required, and the reluctance of the state and county to support the line in this location, the segment was dropped from further consideration.

Segment G (Alm Way Alternative). In this alternative, the line would be located along the north side of Alm Way (without crossing the Snoqualmie Valley Railroad tracks). This alternative would unnecessarily impact the residents along Alm Way just outside of North Bend, whereas there are no residents to be affected along North Bend Way in this area. Impacts would include clearing of the vegetation between the Snoqualmie Valley Railroad tracks and the residents along Alm Way; and acquisition of additional right-of-way from the residents to anchor guy lines in their front yards, unless significantly larger wood or steel poles would be used that would not need to be guyed. For these reasons, the segment was dropped from further consideration.

Segment H (North Bend Way Substation Entrance Alternative). At the request of some residents along Alm Way, BPA considered continuing down North Bend Way past Alm Way for approximately 600 m (2000 ft) before turning into the proposed substation. The alternative would require more clearing than the proposal, including the large spruce trees near a memorial at Gardiner Creek. It would also have negative impacts on views of Mt. Si from the Snoqualmie Valley Railroad. The alternative was dropped from further consideration because of the amount of clearing that would be necessary along North Bend Way, when an alternative existed nearby (the "Split Alternative"). The Split Alternative, which is now the part of the proposal and which modifies Segment H (see Figure 4), crosses Alm Way and continues down North Bend Way for about 245 m (800 ft) beyond Alm Way (instead of 600 m [2000 ft]).

2.3.2 Underground Alternative

BPA was asked to consider placing an unspecified portion of the transmission line underground to mitigate the visual impacts to residents along North Bend Way near SE 372nd. Putting a high-voltage transmission line underground is considerably more

expensive than building a line overhead, even with the new technology that replaces oil-filled conduits with dielectric insulation. While the new technology avoids using oil to dissipate heat, its cost is similar to the cost of using the oil-filled conduits without an oil pumping station. Depending on the length of the underground line (typically, the longer the distance underground, the less it costs per linear foot), design, materials and construction costs probably would be about \$400 per linear foot, compared to about \$60 per linear foot for an overhead line. Assuming a distance of 1,200 m (4,000 ft), undergrounding likely would cost an additional \$1.3-1.4 million over the cost of an overhead line. Because this alternative would add significant costs to the proposed project, it was dropped from further consideration.

2.4 COMPARISON OF ALTERNATIVES












Table 1 compares the Proposed Action and the No Action Alternative based on the purposes of the project described in Section 1.2.

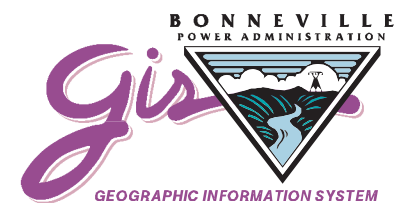
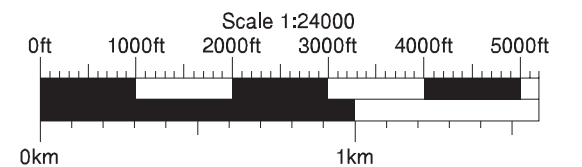
Table 1 Predicted Performance Summary

Purposes	Proposed Action	No Action
Maximize overall system efficiency through one-utility planning.	One transmission line and substation serve most foreseeable customer service needs of all 3 electrical utilities in the area.	Does not meet customer service needs of all 3 electrical utilities in the area. <u>Duplicate facilities may be constructed to serve customer needs.</u>
Minimize impacts to the human environment.	Most impacts are minor, short-term, and/or can be mitigated.	Impacts could be similar to Proposed Action if another entity builds facilities. If facilities are not constructed, <u>the result could be power outages.</u>
Minimize costs.	BPA costs: \$3.4 million Tanner costs: \$2.1 million	BPA costs: \$0. Unknown costs to other utilities.

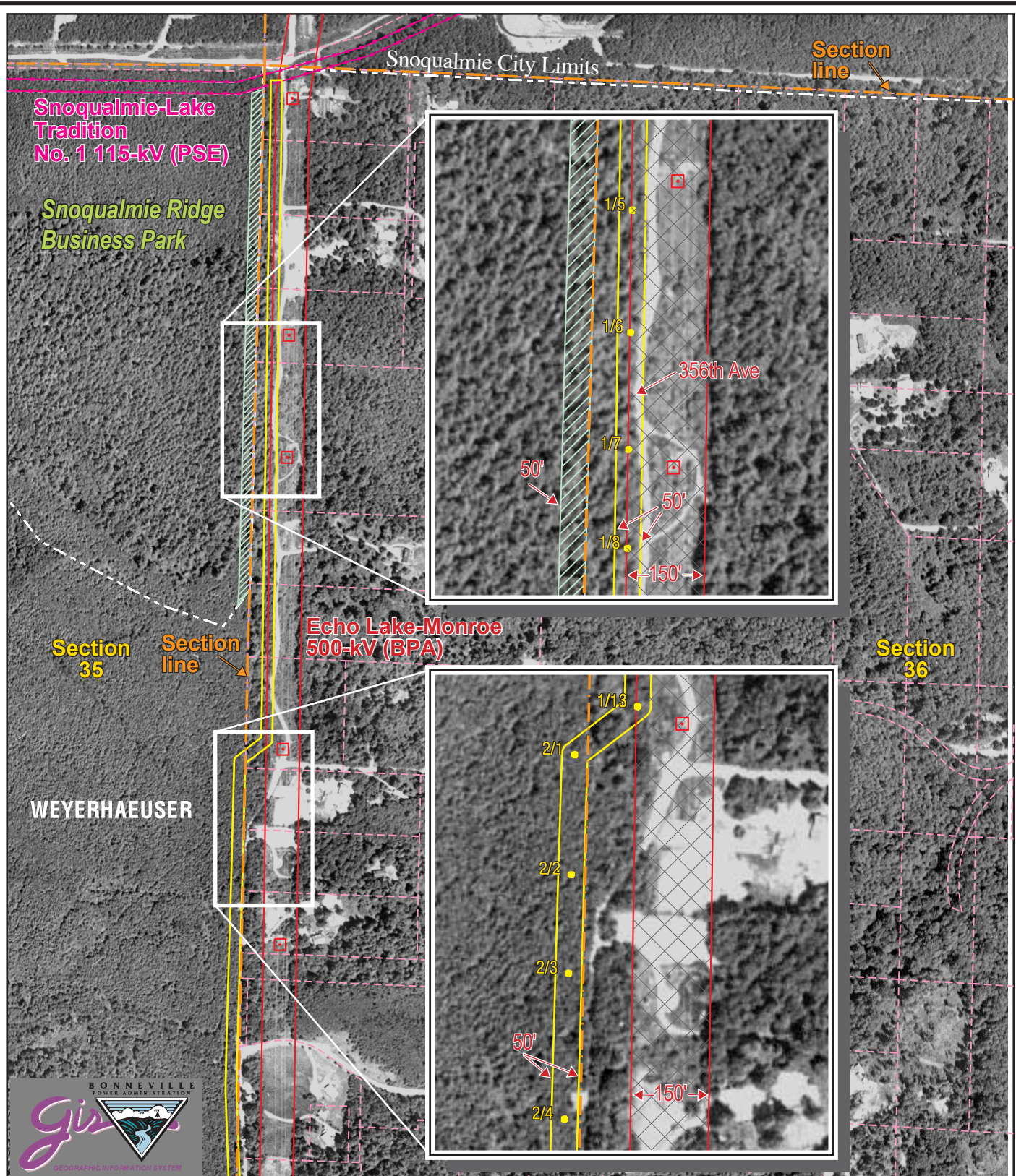
FIGURE 5 LAND USE TANNER ELECTRIC TRANSMISSION LINE PROJECT

LEGEND

-  Agriculture
-  Forest
-  Rural residential
-  Rural city UGA
- Source: King County GIS, 1999.
-  Proposed route
-  Existing BPA Transmission line
-  Existing PSE Transmission line
-  Existing Substation
-  Proposed Substation
-  Snoqualmie
-  North Bend

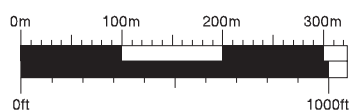


dw00027 August 01, 2000



Aerial Photo: July 1996

RIGHT-OF-WAY ALIGNMENT DETAIL ALONG SE 356th AVENUE TANNER ELECTRIC TRANSMISSION LINE PROJECT



- | | | | |
|--|--------------------------------|--|------------------------|
| | Existing 150' Right-of-way | | Snoqualmie City Limits |
| | Proposed 50' Right-of-way | | Buffer Area (50') |
| | Existing PSE Transmission Line | | Steel Tower (Existing) |
| | Parcel Boundary | | Wood Pole (Proposed) |

Figure 7